

DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final 2/5/99

Revised 9/20/02

RCRA Corrective Action
Environmental Indicator (EI) RCRA Info code (CA750)
Migration of Contaminated Groundwater Under Control

Facility Name: Union Pacific Railroad Company (UPRR) Omaha Shops
Facility Address: 9th and Cass Streets, Omaha, Nebraska 68102
Facility EPA ID #: NED000829754

DETERMINATION RESULT: YE

1. Has all available relevant/significant information on known and reasonably suspected releases to the groundwater media, subject to RCRA Corrective Action (e.g., from Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been **considered** in this EI determination?

X If yes - check here and continue with #2 below.

If no - re-evaluate existing data, or

if data are not available, skip to #8 and enter "IN" (more information needed) status code.

BACKGROUND

Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. The two EI developed to-date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

Definition of "Migration of Contaminated Groundwater Under Control" EI

A positive "Migration of Contaminated Groundwater Under Control" EI determination ("YE" status code) indicates that the migration of "contaminated" groundwater has stabilized, and that monitoring will be conducted to confirm that contaminated groundwater remains within the original "area of contaminated groundwater" (for all groundwater "contamination" subject to RCRA corrective action at or from the identified facility (i.e., site-wide)).

Relationship of EI to Final Remedies

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRA). The "Migration of Contaminated Groundwater Under Control" EI pertains ONLY to the physical migration (i.e., further spread) of contaminated ground water and contaminants within groundwater (e.g., non-aqueous phase liquids or NAPLs). Achieving this EI does not substitute for achieving other stabilization or final remedy requirements and expectations associated with sources of contamination and the need to restore, wherever practicable, contaminated groundwater to be suitable for its designated current and future uses.

Duration / Applicability of EI Determinations

EI Determinations status codes should remain in RCRA Info national database ONLY as long as they remain true (i.e., RCRA Info status codes must be changed when the regulatory authorities become aware of contrary information).

Facility Information

The Union Pacific Railroad Company (UPRR) Omaha Shops are located at 9th and Cass Streets in Omaha, Douglas County, Nebraska. The property originally encompassed approximately 210 acres, just west of the Missouri River, in an industrialized area north of downtown Omaha. The facility is situated within the floodplain of the Missouri River.

The Omaha Shops were in operation for approximately 100 years, with principal functions including a railroad refueling facility, repair shop, paint shop, and car body repair shop for UPRR's locomotive and car fleet. From the 1950s to 1988, the facility served as a major overhaul and maintenance facility for UPRR. In 1988, most of the operations moved to the UPRR facility in Little Rock, Arkansas, and facility demolition began. The only current operations at the site include the Coach Shop, Print Shop, and UPRR Research and Development Laboratory. The Superintendents Building and the B&B Shop are also used for office and storage space.

The Omaha Shops property has been the object of several development proposals since 1987. To facilitate property transfer and redevelopment, the facility was divided into three operable units (OUs) for investigation and cleanup. OU1 covers approximately 100 acres of contaminated soil in the southern portion of the UPRR property. After a series of investigations and corrective actions to prevent exposure to soil contaminants above industrial/commercial risk levels, this area was transferred to the City of Omaha for construction of the Qwest Convention Center and Arena. Another portion of OU1 (bounded by 9th and 11th Streets and Cuming and Webster Streets) is currently being considered for second story residential development by Saddle Creek Records. OU2 addresses contaminated soil across the remainder of the facility to the north. OU3 focuses on contaminated groundwater beneath the entire facility. The three OUs encompass 33 solid waste management units (SWMUs) and 18 areas of concern (AOCs). The table below lists the identified SWMUs and AOCs at the UPRR Omaha Shops site, as well as a summary of corrective actions implemented to date. A map of the SWMUs and AOCs is provided as Attachment 1 to this EI determination. Ongoing investigation and corrective action of these SWMUs and AOCs is required by the Administrative Order on Consent issued by EPA on February 29, 2000.

Summary of OUs and Corrective Actions at the UPRR Omaha Shop Facility

OU	SWMUs and AOCs	Corrective Actions
OU1	SWMUs 1, 2, 3, 4, 5, 6, 7, 7.1, 8, 9, 10, 11, 12, 13, 15, 16, 16.1, 16.2, 16.3, 17, 17.1, 19, 22, 22.1, 23, 23.1, 23.2, 23.3, and 24 AOCs 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 16, 17, and 18	<ul style="list-style-type: none"> RFI and Risk Assessment: 1999 SWMU 24 clean closed with no further action: 2001 CMS recommends excavation of contaminated surface and subsurface soil, use of excavated soil as fill for the Abbott Drive/Cuming Street roadway embankment, and institutional controls (to prohibit subsurface intrusion and limit property to industrial/commercial land uses): 2000 Corrective measures implemented: 2000-2001 Property transferred to City of Omaha for development as a convention center and arena complex (Qwest Center): 2002 Abbott Drive/Cuming Street overpass paved and open to traffic: 2002 Embankment cap maintenance and groundwater monitoring program in place: 2003-2004 CMI embankment monitoring/maintenance discontinued: 2004 Statement of Basis modification proposing additional soil excavation to allow residential development at Saddle Creek Records portion of OU1: 2006 Public Comment Period: In progress through May 2006
OU2	SWMUs 14, 18, 20, and 21 AOCs 10, 11, 12, 13, 14, and 16	<ul style="list-style-type: none"> Asbestos-impacted soil excavation: 2000 Paint Barrel Pits (SWMU 14) soil excavation: 2000 RFI and Risk Assessment Completed: 2001 Acetylene Sludge Pits (SWMU 20) sludge and soil excavation: 2000-2002 CMS recommends no further action with institutional controls (land use covenant to limit property to industrial/commercial land uses): 2006
OU3	Site-wide and offsite groundwater	<ul style="list-style-type: none"> Diesel Fuel Recovery System installed: 1988 Diesel Fuel Recovery System decommissioned: 2000 RFI and Risk Assessment: 1999 through 2005 CMS recommends institutional controls (prohibiting new well installation), annual groundwater monitoring, and continued natural attenuation: 2006

References

1. RCRA Facility Investigation for OU1. Prepared by URS Greiner Woodward Clyde. Dated June 1999.
2. Corrective Measures Study for OU1. Prepared by URS Greiner Woodward Clyde. Dated February 2000.
3. Administrative Order on Consent for the UPRR Omaha Shops site. Prepared by EPA. Dated February 29, 2000.
4. Letter from William Gidley, Nebraska Department of Environmental Quality, to Jeffrey McDermott, Union Pacific Railroad Company, re: Closure Certification Determination for Container Storage Area (SWMU 24). Dated January 5, 2001.
5. Asbestos Interim Measures Completion Report. Prepared by URS. Dated August 2001.
6. Paint Barrel Pits Interim Measures Completion Report. Prepared by URS. Dated August 2001.
7. RCRA Facility Investigation for OU2. Prepared by URS. Dated November 2001.
8. Acetylene Sludge Pits Interim Measures Completion Report. Prepared by URS. Dated August 2002.
9. Corrective Measures Completion Report for OU1. Prepared by URS. Dated April 2004.
10. Letter from Jeffrey McDermott, Union Pacific Railroad Company, to Kenneth Herstowski, EPA Region 7, re: RCRA Corrective Action Progress Report for the Fourth Quarter of 2005. Dated January 9, 2006.
11. Corrective Measures Study for OU2. Prepared by URS. Dated February 2006.
12. Corrective Measures Study for OU3. Prepared by URS. Dated March 2006.
13. Modification of the Statement of Basis for Union Pacific Railroad Addressing the Portion of OU1 Included in Saddle Creek Records. Prepared by EPA Region 7. Dated March 31, 2006.

2. Is groundwater known or reasonably suspected to be “contaminated”¹ above appropriately protective “levels” (i.e., applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria [e.g., Maximum Contaminant Levels (MCLs), the maximum permissible level of a contaminant in water delivered to any user of a public water system under the Safe Drinking Water Act]) from releases subject to RCRA Corrective Action, anywhere at, or from, the facility?

 X If yes - continue after identifying key contaminants, citing appropriate “levels,” and referencing supporting documentation.

 If no - skip to #8 and enter “YE” status code, after citing appropriate “levels,” and referencing supporting documentation to demonstrate that groundwater is not “contaminated.”

 If unknown - skip to #8 and enter “TN” status code.

Rationale

Shallow unconsolidated deposits at the UPRR Omaha Shops site are characterized by fill and alluvium. The fill ranges in thickness from 1 to 9 feet and consists of cinders, brick, glass, metal, gravel, and silt. Alluvium deposits underlying the fill consist of interbedded clay, silt, sand, and gravel. Groundwater is first encountered in the alluvial sediments at depths ranging from 3 to 15 feet below the ground surface (bgs). With a hydraulic conductivity ranging between 0.3 and 0.003 feet per day (1×10^{-6} to 1×10^{-4} centimeters per second), groundwater flows slowly toward the east beneath the site. The alluvial sediments are underlain by limestone and shale bedrock at depths between 20 and 50 feet bgs (Ref. 2). Groundwater samples collected during various investigations at the site were typically collected at the shallow water table and at the deeper contact between the alluvium and bedrock.

A total of 17 monitoring wells were installed at the Omaha Shops during the 1990 site investigation. At that time, a variety of volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and metals were reported in groundwater above their respective maximum contaminant levels (MCLs) or another appropriate action level. Additional sampling and data evaluation completed during the OU3 RCRA Facility Investigation (RFI) indicated only VOCs and lead in groundwater at levels of potential concern (Ref. 2). Because the monitoring wells had already been abandoned, an assessment of current VOC and lead concentrations was completed by collecting direct push water samples in the areas historically containing the highest contaminant concentrations in groundwater (SWMUs 4 and 6). Additional direct push groundwater sampling was conducted at, upgradient, and downgradient of the Acetylene Sludge Pits (SWMU 20) in July 2005. Groundwater quality data from 121 separate locations were evaluated during and subsequent to the OU3 RFI, and prior to evaluating potential corrective actions for OU3.

The RFI confirmed the presence of VOCs, randomly distributed in groundwater throughout OU3 (as shown on the figure in Attachment 2 to this EI determination). A hot spot of more significant groundwater contamination was reported during the Acetylene Sludge Pits portion of the investigation in 2005. However, the highest levels of VOC contamination were reported in groundwater samples collected upgradient of the sludge pits at sample locations DP05 and DP07 (shown on the figure in Attachment 3 to this EI determination). The former sludge pits are not thought to be the source of these elevated impacts based on groundwater flow direction and the interpreted bedrock contours, which are higher upgradient than at the pits area (Ref. 1). Instead, it appears likely that these VOCs are attributable to the active steel fabrication and plating company located west of the UPRR Omaha Shops site (Ref. 2). Consequently, groundwater contaminant concentrations reported upgradient of the sludge pits will not be considered further for purposes of this EI determination.

The highest contaminant concentrations in groundwater at the UPRR Omaha Shops site are listed in the table below. Concentrations are presented for groundwater across the majority of OU3 using the most recent data from 2002, and

¹“Contamination” and “contaminated” describes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriate “levels” (appropriate for the protection of the groundwater resource and its beneficial uses).

for groundwater associated with the Acetylene Sludge Pits using the 2005 data. The sludge pits groundwater data includes both onsite and offsite detections, but does not include the high levels of contamination upgradient of the pits area and attributable to the nearby steel fabrication and plating facility. Only those constituents reported at concentrations above their applicable Maximum Contaminant Levels (MCLs) or EPA Region 9 Preliminary Remediation Goals (PRGs) are included in the table.

Maximum Detected Groundwater Contaminant Concentrations at the UPRR Omaha Shops Site

Compound	MCL or PRG (µg/L)	Maximum Concentration (µg/L)
OU3 Groundwater (Outside the Acetylene Sludge Pits Area) – 2002 Data		
Benzene	5	29
Chloroethane	4.6	5.5
Chloroform	0.17	1.3
cis-1,2-Dichloroethene (cDCE)	70	280
Methylene Chloride	4.3	8.7
Tetrachloroethylene (PCE)	5	442
Trichloroethylene (TCE)	5	17.5
1,2,4-Trimethylbenzene	12	138
1,3,5-Trimethylbenzene	12	24.9
Vinyl Chloride (VC)	2	3.8
Acetylene Sludge Pits Groundwater – 2005 Data		
Benzene	5	13.4
1,1-Dichloroethene	7	41
cis-1,2-Dichloroethene (cDCE)	70	19,000
trans-1,2-Dichloroethene (tDCE)	100	440
Tetrachloroethylene (PCE)	5	991
Trichloroethylene (TCE)	5	1,750
Vinyl Chloride (VC)	2	1,180 (onsite) 93.5 (offsite)

Maximum Contaminant Levels (MCLs) from EPA's Safe Drinking Water Act Regulations and Health Advisories.
Tap water Preliminary Remediation Goals (PRGs) from EPA Region 9 PRGs table for compounds with no established MCL.
Constituents with neither MCLs nor PRGs will not be considered further in this EI determination.
Data from Refs. 1 and 2.

Based on VOC concentrations presented on the figure in Attachment 2, groundwater contaminated by VOCs above applicable screening levels appears to be bounded by the Missouri River in the southern portion of the site, direct push sampling locations DP28 through DP30 in the center of the site, and by direct push sampling locations DP09 through DP14 downgradient of the former acetylene sludge pits. Because the migration path of VOCs in deep groundwater appears to be influenced by the bedrock surface orientation (Ref. 1), vertical movement of VOC-impacted groundwater appears to be limited to the alluvium.

References

1. Additional Groundwater Sampling Technical Memorandum for OU3. Prepared by URS. Dated October 4, 2005.
2. Corrective Measures Study for OU3. Prepared by URS. Dated March 2006.

3. Has the **migration** of contaminated groundwater **stabilized** (such that contaminated groundwater is expected to remain within “existing area of contaminated groundwater”² as defined by the monitoring locations designated at the time of this determination)?

 X If yes - continue, after presenting or referencing the physical evidence (e.g., groundwater sampling/measurement/migration barrier data) and rationale why contaminated groundwater is expected to remain within the (horizontal or vertical) dimensions of the “existing area of groundwater contamination”²).

 If no (contaminated groundwater is observed or expected to migrate beyond the designated locations defining the “existing area of groundwater contamination”²) - skip to #8 and enter “NO” status code, after providing an explanation.

 If unknown - skip to #8 and enter “IN” status code.

Rationale

Source Removal and Natural Attenuation

Due to various source removal actions and natural attenuation, groundwater contamination at the UPRR Omaha Shops site has stabilized. Corrective measures implemented to date include:

- Removal of approximately 69,000 gallons of diesel fuel found on groundwater at the southern end of the site;
- Excavation of approximately 45,000 cubic yards (cy) of lead-contaminated soil from OU1;
- Excavation of approximately 46,500 cy of asbestos-containing soil from OU2;
- Excavation of 7,000 cy of soil containing semivolatile organic compounds (SVOC), antimony, total lead, and leachable lead from SWMU 14;
- Excavation of approximately 7,200 cy of PCE-contaminated soil and sludge from the former Acetylene Sludge Pits; and
- Removal of buried lead-containing battery casings encountered during grading activities at the proposed OU1 residential redevelopment site.

Confirmation sampling conducted after each excavation effort indicated that the soil contamination had been successfully removed, and that attendant risks (based on anticipated future land uses) had been mitigated. In addition to addressing human health risk levels, these soil removal actions significantly reduced the potential for continuing contaminant migration to groundwater. Without an ongoing source, contamination concentrations in groundwater are expected to decline over time due to natural processes such as dispersion, dilution, and natural attenuation. VOC concentrations reported in groundwater between 1999 and 2005 confirm that natural attenuation is occurring. In shallow groundwater, concentrations of 1,1-DCE, cDCE, PCE, and TCE have generally decreased, and concentrations of tDCE and VC (degradation products of PCE and TCE) have slightly increased. In deep groundwater, PCE concentrations have decreased, while concentrations of its daughter products (TCE, 1,1-DCE, cDCE, tDCE, and VC) have slightly increased. The table below provides specific examples of these natural attenuation trends in the hot spot of groundwater at the acetylene sludge pits, as measured at sampling locations

² “existing area of contaminated groundwater” is an area (with horizontal and vertical dimensions) that has been verifiably demonstrated to contain all relevant groundwater contamination for this determination, and is defined by designated (monitoring) locations proximate to the outer perimeter of “contamination” that can and will be sampled/tested in the future to physically verify that all “contaminated” groundwater remains within this area, and that the further migration of “contaminated” groundwater is not occurring. Reasonable allowances in the proximity of the monitoring locations are permissible to incorporate formal remedy decisions (i.e., including public participation) allowing a limited area for natural attenuation.

DP01 and DP02. Maximum offsite contaminant concentrations are provided in the table as well for reference. The contaminants are presented in order of degradation.

Contaminant	1999 Maximum Concentrations (µg/L)	2002 Maximum Concentrations (µg/L)	2005 Maximum Concentrations (µg/L)	2005 Offsite Concentrations (µg/L)
PCE	198,000	7,640	991	ND
TCE	22,300	1,850	1,750	ND
DCE	147,000	48,100	57,200	5
VC	2,840	255	8,510	93.5

ND: Constituent not detected in groundwater.
Data from Ref. 7.

As shown in the table, parent compound concentrations decline as daughter product concentrations increase somewhat. If conditions remain favorable for degradation, all of the chlorinated compound present in groundwater will eventually biodegrade to nontoxic constituents. Until that time (which has not yet been determined via biodegradation modeling), UPRR proposes a program of annual groundwater monitoring as outlined in the response to Question 7 to ensure that natural attenuation continues to effectively reduce contaminant concentrations (Ref. 7).

It should also be noted that elevated lead levels were recently detected in soil at the proposed OU1 residential redevelopment site, and toxicity characteristic leaching procedure (TCLP) samples were collected in the last quarter of 2005 to determine the potential for migration of lead contamination to groundwater in this area (Ref. 6). The results of the TCLP analyses was not found in available file materials. Nevertheless, based on removal of the lead source material in this area (i.e., buried battery casings), natural groundwater processes such as dispersion and mixing should reduce lead levels in groundwater over time. Furthermore, according to the CMS Report for OU3 (Ref. 7), lead concentrations detected in groundwater across the site and at the acetylene sludge pits are not expected to be of significant concern to human health.

Stabilization of Risks Associated with Groundwater

Groundwater at the Omaha Shops site has been classified by the State of Nebraska as a RAC-3 aquifer (Ref. 5). Groundwater in this classification is not expected to be used in the future and is given the lowest priority for review of cleanups by NDEQ. Groundwater use for industrial, commercial, or residential use is not practical because of the very low yields of groundwater available from the impacted formation. Also, Part II of the Omaha Municipal Code, Chapter 12, Article VI, requires a permit and a demonstration of need prior to installation of private water wells in the area of the site. Because residents and business owners in the area are served by the Metropolitan Utilities District (MUD) and received treated water, they cannot demonstrate the need for a new well. Approvals are given only for locations not served by MUD, and which do not involve potable water or livestock water. Consequently, groundwater exposure is not expected to occur as contaminant concentrations continue to decline. Accordingly, a human health risk assessment conducted as part of the RFI concluded that contamination in groundwater across most of the site posed no unacceptable risks to human health. Furthermore, although the hot spot of groundwater contamination beneath the Acetylene Sludge Pits posed unacceptable risks to construction workers who may come into contact with the impacted media during intrusive activities at the site, such workers would be wearing appropriate personal protective equipment while performing intrusive activities.

References

1. Asbestos Interim Measures Completion Report. Prepared by URS. Dated August 2001.
2. Paint Barrel Pits Interim Measures Completion Report. Prepared by URS. Dated August 2001.
3. Acetylene Sludge Pits Interim Measures Completion Report. Prepared by URS. Dated August 2002.
4. Corrective Measures Completion Report for OU1. Prepared by URS. Dated April 2004.
5. Additional Groundwater Sampling Technical Memorandum for OU3. Prepared by URS. Dated October 4, 2005.
6. Letter from Jeffrey McDermott, Union Pacific Railroad Company, to Kenneth Herstowski, EPA Region 7, re: RCRA Corrective Action Progress Report for the Fourth Quarter of 2005. Dated January 9, 2006.
7. Corrective Measures Study for OU3. Prepared by URS. Dated March 2006.
8. Modification of the Statement of Basis for Union Pacific Railroad Addressing the Portion of OU1 Included in Saddle Creek Records. Prepared by EPA Region 7. Dated March 31, 2006.

4. Does "contaminated" groundwater **discharge** into **surface water** bodies?

 X If yes - continue after identifying potentially affected surface water bodies.

 If no - skip to #7 (and enter a "YE" status code in #8, if #7 = yes) after providing an explanation and/or referencing documentation supporting that groundwater "contamination" does not enter surface water bodies.

 If unknown - skip to #8 and enter "IN" status code.

Rationale

No surface water bodies are present on the UPRR Omaha Shops site. However, the Missouri River is located less than 1,000 feet east of the site. Based on the relatively shallow depth to groundwater and the fact that groundwater flows toward the river, it is possible that groundwater contamination could discharge to and impact quality of surface water in the Missouri River.

Contaminants could also be transported to surface water via overland flow across contaminated surface soil and stormwater runoff. However, significant surface soil contamination across the site has been addressed by various corrective measures involving excavation and backfilling. Thus, potential impacts associated with this method of contaminant transport (surface soil to surface water via overland flow and stormwater runoff) will not be considered further in this EI determination.

References

1. RCRA Facility Investigation for OU1. Prepared by URS Greiner Woodward Clyde. Dated June 1999.
2. Corrective Measures Completion Report for OU1. Prepared by URS. Dated April 2004.
3. Corrective Measures Study for OU2. Prepared by URS. Dated February 2006.
4. Corrective Measures Study for OU3. Prepared by URS. Dated March 2006.

5. Is the **discharge** of "contaminated" groundwater into surface water likely to be "**insignificant**" (i.e., the maximum concentration³ of each contaminant discharging into surface water is less than 10 times their appropriate groundwater "level," and there are no other conditions (e.g., the nature, and number, of discharging contaminants, or environmental setting), which significantly increase the potential for unacceptable impacts to surface water, sediments, or eco-systems at these concentrations)?

 X If yes - skip to #7 (and enter "YE" status code in #8 if #7 = yes), after documenting: 1) the maximum known or reasonably suspected concentration³ of key contaminants discharged above their groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) provide a statement of professional judgement/explanation (or reference documentation) supporting that the discharge of groundwater contaminants into the surface water is not anticipated to have unacceptable impacts to the receiving surface water, sediments, or eco-system.

_____ If no - (the discharge of "contaminated" groundwater into surface water is potentially significant) - continue after documenting: 1) the maximum known or reasonably suspected concentration³ of each contaminant discharged above its groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) for any contaminants discharging into surface water in concentrations³ greater than 100 times their appropriate groundwater "levels," the estimated total amount (mass in kg/yr) of each of these contaminants that are being discharged (loaded) into the surface water body (at the time of the determination), and identify if there is evidence that the amount of discharging contaminants is increasing.

_____ If unknown - enter "IN" status code in #8.

Rationale

As documented in available reports and discussed above, constituents of potential concern (COPCs) for groundwater at the UPRR Omaha Shops site are VOCs, primarily PCE and its decomposition daughter products. In the absence of actual surface water data, contaminant concentrations in groundwater immediately upgradient of the river can be compared to applicable groundwater standards multiplied by a factor of ten to account for concentrations reductions due to natural processes occurring at the point of discharge into surface water (e.g., mixing, dispersion). For purposes of this assessment, the EI will consider VOC concentrations measured in 2002 at OU3 sampling locations DP28 through DP32, as well as VOC concentrations measured in 2005 at acetylene sludge pit sampling locations DP09, DP11, and DP14. The table below lists the highest VOC concentrations reported in groundwater from these direct push sampling locations, along with applicable evaluation criteria, as discussed above.

³ As measured in groundwater prior to entry to the groundwater-surface water/sediment interaction (e.g., hyporheic) zone.

Compound	MCL or PRG (µg/L)	MCL or PRG X 10 (µg/L)	Maximum Concentration Upgradient of SW (µg/L)	Potential SW Concern?
Benzene	5	50	29	No
Chloroethane	4.6	46	5.5	No
Chloroform	0.17	1.7	1.3	No
cis-1,2-Dichloroethene (cDCE)	70	700	15.4	No
Ethylbenzene	700	7,000	37.2	No
n-Propylbenzene	240	2,400	17.8	No
tert-Butylbenzene	240	2,400	9.1	No
n-Butylbenzene	240	2,400	8.3	No
1,2,4-Trimethylbenzene	12	120	138	Yes
1,3,5-Trimethylbenzene	12	120	24.9	No
Vinyl Chloride (VC)	2	20	3.8	No
Xylenes (total)	10,000	100,000	105	No

Maximum Contaminant Levels (MCLs) from EPA's Safe Drinking Water Act Regulations and Health Advisories.
Tap water Preliminary Remediation Goals (PRGs) from EPA Region 9 PRGs table for compounds with no established MCL.

As shown, only the detection of 1,2,4-trimethylbenzene at direct push location DP-31 exceeded the applicable surface water quality criteria, and only by a very small margin. Because there was only a slight exceedance, and because additional attenuation has likely occurred since the data were collected in 2002, significant impacts to surface water quality in the Missouri River are not expected and will not be considered further in this EI determination.

Similarly, based on the lack of significant surface soil and groundwater contamination upgradient of the river, the Missouri River sediment is not expected to be significantly impacted. Furthermore, the primary COPCs (i.e., PCE and its daughter products) do not bind well to soil and sediment and, in the absence of a continuing contaminant source, would not be expected to accumulate significantly in these media. Consequently, sediment need not be addressed further in this EI determination.

Reference

1. Corrective Measures Study for OU3. Prepared by URS. Dated March 2006.

6. Can the **discharge** of “contaminated” groundwater into surface water be shown to be “**currently acceptable**” (i.e., not cause impacts to surface water, sediments or eco-systems that should not be allowed to continue until a final remedy decision can be made and implemented⁴)?

_____ If yes - continue after either: 1) identifying the Final Remedy decision incorporating these conditions, or other site-specific criteria (developed for the protection of the site’s surface water, sediments, and eco-systems), and referencing supporting documentation demonstrating that these criteria are not exceeded by the discharging groundwater; OR 2) providing or referencing an interim-assessment⁵, appropriate to the potential for impact, that shows the discharge of groundwater contaminants into the surface water is (in the opinion of a trained specialists, including ecologist) adequately protective of receiving surface water, sediments, and eco-systems, until such time when a full assessment and final remedy decision can be made. Factors which should be considered in the interim-assessment (where appropriate to help identify the impact associated with discharging groundwater) include: surface water body size, flow, use/classification/habitats and contaminant loading limits, other sources of surface water/sediment contamination, surface water and sediment sample results and comparisons to available and appropriate surface water and sediment “levels,” as well as any other factors, such as effects on ecological receptors (e.g., via bio-assays/benthic surveys or site-specific ecological Risk Assessments), that the overseeing regulatory agency would deem appropriate for making the EI determination.

_____ If no - (the discharge of “contaminated” groundwater can not be shown to be “**currently acceptable**”) - skip to #8 and enter “NO” status code, after documenting the currently unacceptable impacts to the surface water body, sediments, and/or eco-systems.

_____ If unknown - skip to 8 and enter “IN” status code.

Rationale

This question is not applicable. See the response to Question 5.

⁴ Note, because areas of inflowing groundwater can be critical habitats (e.g., nurseries or thermal refugia) for many species, appropriate specialist (e.g., ecologist) should be included in management decisions that could eliminate these areas by significantly altering or reversing groundwater flow pathways near surface water bodies.

⁵ The understanding of the impacts of contaminated groundwater discharges into surface water bodies is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration to be reasonably certain that discharges are not causing currently unacceptable impacts to the surface waters, sediments or eco-systems.

7. Will groundwater **monitoring** / measurement data (and surface water/sediment/ecological data, as necessary) be collected in the future to verify that contaminated groundwater has remained within the horizontal (or vertical, as necessary) dimensions of the "existing area of contaminated groundwater?"

 X If yes - continue after providing or citing documentation for planned activities or future sampling/measurement events. Specifically identify the well/measurement locations which will be tested in the future to verify the expectation (identified in #3) that groundwater contamination will not be migrating horizontally (or vertically, as necessary) beyond the "existing area of groundwater contamination."

 If no - enter "NO" status code in #8.

 If unknown - enter "IN" status code in #8.

Rationale

Although the CMS Report for OU3 has yet to be approved by EPA, UPRR, in the CMS, expressed their intention to implement a program of institutional controls and groundwater monitoring at the Omaha Shops site. Specifically, UPRR proposes annual monitoring at six monitoring locations for VOCs and natural attenuation parameters. The proposed monitoring locations are situated adjacent to former Acetylene Sludge Pits direct push sampling locations DP01, DP02, DP07, DP08, DP10, and DP-12. Because the OU3 human health risk assessment concluded that site-related groundwater contamination elsewhere at the site (i.e., not associated with the former acetylene sludge pits) did not pose unacceptable risks based on expected future uses of the property, only groundwater associated with the former sludge pits will be monitored.

Monitoring results will be tabulated, mapped, and evaluated to identify any trends, with specific attention to unusual or unexpected results. The annual review will determine if the then-current program is sufficient to monitor the groundwater impact area, or if any changes need to be made. If monitoring results indicate increasing levels of VOCs (other than expected and temporary increases in concentrations of decomposition daughter products), appropriate contingency actions will be developed for review by EPA.

Reference


1. Corrective Measures Study for OU3. Prepared by URS. Dated March 2006.

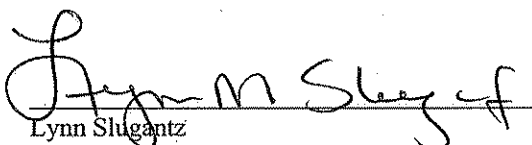
8. Check the appropriate RCRA Info status codes for the Migration of Contaminated Groundwater Under Control EI (event code CA750), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (attach appropriate supporting documentation as well as a map of the facility).

 X YE - Yes, "Migration of Contaminated Groundwater Under Control" has been verified. Based on a review of the information contained in this EI determination, it has been determined that the "Migration of Contaminated Groundwater" is "Under Control" at the **UPRR Omaha Shops** facility, EPA ID # **NED000829754**, located in **Omaha, Nebraska**. This determination will be re-evaluated when pertinent additional information becomes available or when the Agency becomes aware of significant changes at the facility.

 NO - Unacceptable migration of contaminated groundwater is observed or expected. Based on a review of the information contained in this EI determination, it has been determined that the "Migration of Contaminated Groundwater" is not "Under Control".

 IN - More information is needed to make a determination.

Completed by  Date 7/21/08
Ken Herstowski
EPA Project Manager

Supervisor  Date 7-24-08
Lynn Slugantz
Chief, RCRA Permits and Corrective Action Branch

Locations where References may be found:

EPA Region 7 RCRA Records Center
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